Winthrop Quadrangle, Maine

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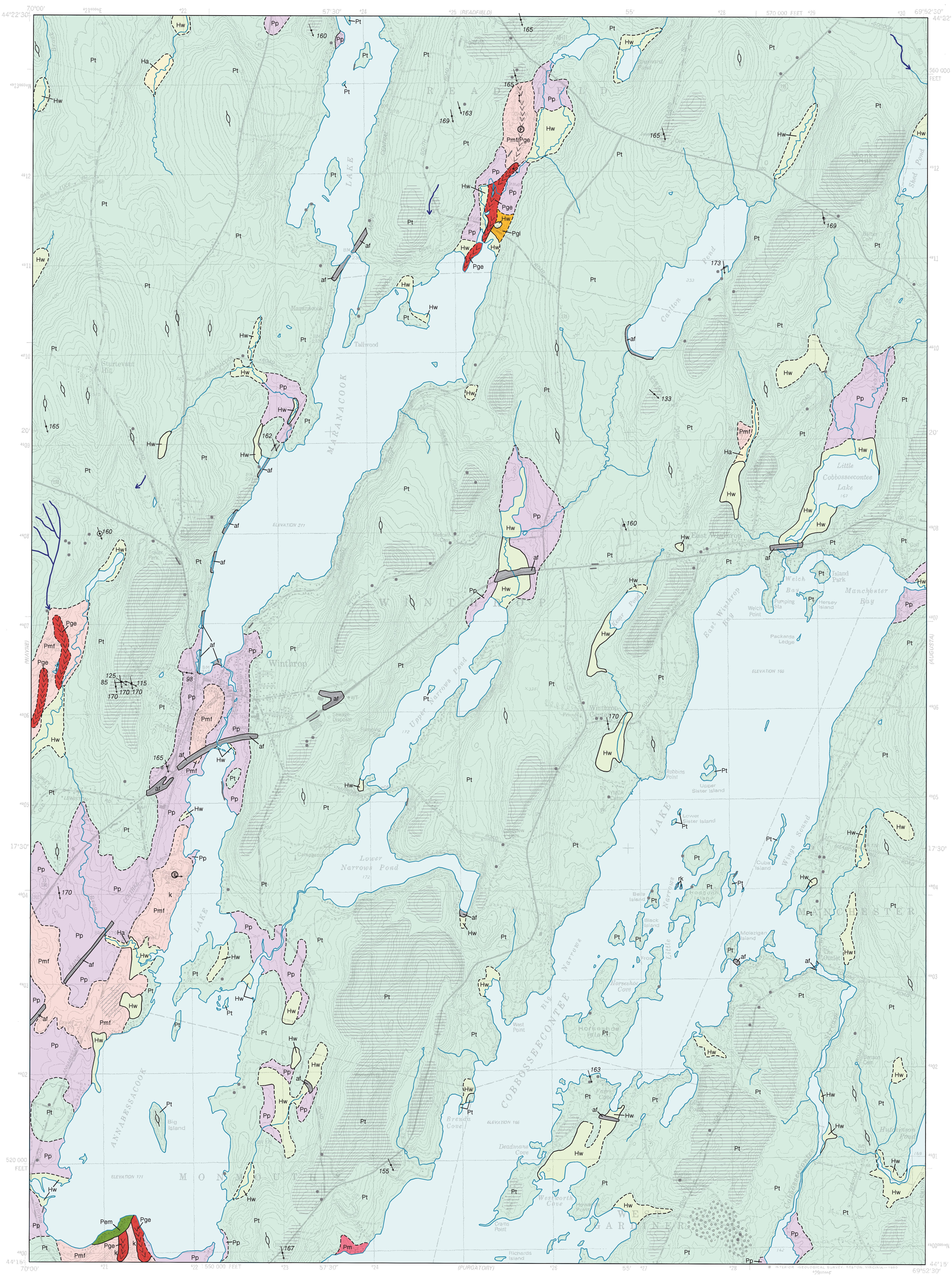
Surficial Geology



SOURCES OF INFORMATION

Surficial geologic mapping of the Winthrop quadrangle was conducted by Woodrow B. Thompson in 2003-04 for the STATEMAP program. Some of the data included here were collected by W. B. Thompson during reconnaissance surficial mapping of the Augusta 15-minute quadrangle in 1975 and scattered observations during the 1980's and 1990's.

Quadrangle Location

SCALE 1 : 24,000

1 MILE — 7000 FEET — 1 KILOMETER

CONTOUR INTERVAL 10 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Winthrop quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not impute responsibility for any present or potential effects on the natural resources.

Ha	**Stream alluvium** - Sand, gravel, and silt deposited on flood plains of streams. May include some wetland deposits.
Hw	**Wetland deposits** - Peat, muck, silt, and clay in poorly drained areas.
Pm	**Unclassified glaciomarine sediments.** Small deposit of fine sand near south edge of quadrangle. May be part of the Presumpscot Formation.
Pp	**Presumpscot Formation** - Glaciomarine silt, clay, and sand deposited on the late-glacial sea floor.
Pmf	**Glaciomarine fans** - Sand and gravel deposited as submarine fans at the glacier margin during recession of the late Wisconsinan ice sheet. Includes patches of Presumpscot clay-silt, which are locally fossiliferous.
Pgi	**Ice-contact deposits** - Glacial sand and gravel formed in contact with remnant ice in the Beaver Brook valley.
Pge	**Esker** - Sand and gravel deposited by glacial meltwater streams in tunnels beneath the ice. Chevron symbols show inferred direction of former stream flow.
Pem	**End Moraine** - Ridge of glacial till deposited at the margin of the late Wisconsinan ice sheet when it stood at the south end of Annabessacook Lake.
Pt	**Till** - Loose to very compact, poorly sorted, massive to weakly stratified mixture of sand, silt, and gravel-size rock debris deposited by glacial ice. Locally includes lenses of waterlaid sand and gravel. Boulders commonly present on ground surface.
	Bedrock outcrops/thin-drift areas - Ruled pattern indicates areas where bedrock outcrops are common and/or surficial sediments are generally less than 10 ft thick. Mapped from air photos and ground observations. Actual thin-drift areas probably are more extensive than shown. "rk" indicates large area of bedrock exposure. Dots mark locations of small individual outcrops.
af	**Artificial fill** - Variable mixtures of earth, rock, and/or man-made materials used as fill for roads, railroads, and the dam at Carlton Pond. Shown only where large enough to affect the contour pattern on the topographic map.

-------	**Contact** - Boundary between map units dashed where location is approximate.
	Glacially streamlined hill - Symbol shows long axis of hill or ridge shaped by flow of glacial ice, and which is parallel to former ice-flow direction.
135	**Glacial striation locality** - Arrow shows ice-flow direction inferred from striations on bedrock. Dot marks point of observation. Number is azimuth (in degrees) of flow direction.
135	**Till fabric site** - Arrow shows direction of glacial ice flow indicated by parallel alignment of elongate stones in till.
	Dip of cross-bedding - Arrow shows average dip direction of cross-bedding in glaciomarine fan deposits, which indicates direction of fan progradation. Dot marks point of observation.
	Meltwater channel - Channel eroded by glacial meltwater stream. Arrow shows inferred direction of former stream flow.
>>>>>	**Crest of esker** - Alignment of symbols shows trend of esker ridge. Chevrons point in direction of meltwater flow.
	Area of many large boulders, where observed. May be more extensive than shown.
	Area where original topography has been modified or obliterated by excavation.
k	**Kettle** - Depression created by melting of buried glacial ice and collapse of overlying sediments.
Ⓕ	**Marine fossil locality.**

USES OF SURFICIAL GEOLOGY MAPS

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the products of postglacial geologic processes, such as river floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the areal distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of glacial lakes or the glacial sea, now long gone from the state. This glacial geologic history of the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial geology maps are often best used in conjunction with related maps such as surficial materials maps or significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to surficial geology. Construction projects such as locating new roads, excavating foundations, or siting new homes may be better planned with a good knowledge of the surficial geology of the site. Refer to the list of related publications below.

OTHER SOURCES OF INFORMATION

1. Thompson, W. B., and Locke, D. B., 2004, Surficial materials of the Winthrop quadrangle, Maine: Maine Geological Survey, Open-File Map 04-33.
2. Neil, C. D. and Weddle, Thomas K., 2004, Significant sand and gravel aquifers of the Winthrop quadrangle, Maine: Maine Geological Survey, Open-File Map 04-78.
3. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print).
4. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.